g) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system; and

h) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagent means located in said fluid containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said valve.

2. A valve according to claim 1, wherein said armature pole portion comprises a body of magnetic material within a titanium enclosure.

3. A valve according to claim 2, wherein said body is in the form of a disc and wherein said enclosure comprises a cap having a base contacting one axial face of said disc and an annular rim contacting the periphery of said disc and a disc-shaped body contacting the opposite axial end face of said disc and abutting said rim of said cap.

4. A valve according to claim 3, wherein said rim of said cap extends slightly axially beyond the periphery of said disc and said disc-shaped body fits within and contacts said rim of said cap and further including a weld ring embracing the periphery of said rim so that said ring, rim and disc-shaped body can be welded together at the junctions thereof.

5. A valve according to claim 3, further including at least one vent passage provided in said disc shaped body to evacuate residual gas during assembly, said passage being sealed by a plug after assembly.

6. A valve according to claim 3, wherein said body is of nickel-iron alloy.

7. A valve according to claim 1, wherein said armature pole portion comprises a body of magnetic material in the form of a disc wherein the opposite axial end faces of said disc are disposed substantially perpendicular to the direction of travel of said armature and wherein the periphery of said disc is located close to the inner surface of said housing.

8. A valve according to claim 7, wherein said body is of chrome-molybdenum-iron alloy.

9. A valve according to claim 1, wherein said armature pole portion contacts a surface of said barrier means when said gap is closed to change the control state of said valve and wherein said barrier mean is provided with passage means along said surface to reduce the time required for said pole portion to separate from said barrier means during movement of said armature and to reduce surface tension effects between said barrier means and said pole portion.

10. A valve according to claim 8, wherein said armature pole portion has a peripheral surface in closely spaced relation to the inner surface of said housing and further including longitudinally extending passage means formed in said peripheral surface for co-operating with said passage means on said barrier means.

11. A valve according to claim 8, wherein said armature pole portion has a peripheral surface in closely spaced relation to the inner surface of said housing and further including longitudinally extending passage means formed in said housing inner surface adjacent said pole portion peripheral surface for co-operating with said passage means on said barrier means.

12. A valve according to claim 1, wherein said armature pole portion is provided with a longitudinally extending bushing and wherein said armature plunger portion comprises a shaft received in said bushing so that the length of the plunger can be changed to adjust the stroke.

13. A valve according to claim 11, further including filter means at said first and second ports.

14. A valve according to claim 11, wherein said valve means comprises a valve element associated with said one port and a valve seat carried by said plunger for contacting said valve element.

15. A valve according to claim 14, wherein said valve element comprises an annular body surrounding said one port and provided with a sharp annular edge axially facing toward said valve seat, and wherein said valve seat comprises a body of elastomer material on the end of said plunger having a flat axial surface adapted to sealingly contact said annular edge.

16. A valve according to claim 1, wherein said armature plunger portion is provided with guiding means in the form of a flange disposed substantially perpendicular to the direction of armature travel and having a peripheral surface in closely spaced relation to the inner surface of said housing.

17. A valve according to claim 16, further including at least one flow passage means formed in said peripheral surface of said flange.

18. A valve according to claim 1, wherein said armature pole portion comprises a solid body of chrome-molybdenum-iron alloy heat treated to provide enhanced magnetic flux density and coercive force properties.

19. A valve according to claim 1, wherein said armature pole

portion and said plunger portion are of fixed length and wherein said one port is located in a component of said housing separated from the remainder of said housing by shim means so as to allow adjustment of the distance between said one port and said valve means on said plunger portion.

20. A valve according to claim 1, wherein said armature pole portion comprises a solid body of magnetic material in the form of a disc wherein the opposite axial end faces of said disc are disposed substantially perpendicular to the direction of travel of the armature, wherein the periphery of said disc is located close to the inner surface of said housing and wherein at least one through passage is provided in said body between the opposite axial end faces thereof.

21. A valve according to claim 1, wherein said valve means comprises a valve seat carried by said plunger and having a surface disposed substantially perpendicular to the direction of travel of said armature and wherein said one port is defined on an inner surface of said housing having a frusto conical formation diverging away from said valve seat surface to facilitate initial fluid flow upon opening of said valve.

22. A valve according to claim 1, wherein said armature pole portion contacts said barrier means when said gap is closed to change the control state of said valve and wherein said barrier means includes a surface portion of conical shape wherein the apex of the cone faces toward said armature pole portion so as to enhance the separation of said pole portion from said barrier means during movement of said armature.

23. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

a) a housing including a fluid containing region having first and second chambers and first and second ports in

fluid communication with said first and second chambers, respectively;

b) electromagnet means carried by said housing and located externally of said fluid containing region;

c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;

d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;

e) said armature pole portion comprising a solid body exclusively of corrosion resistant magnetic material occupying a major portion of the one of said chambers in which it is located and having a lateral dimensions several times greater than the longitudinal dimensions thereof, said magnetic material consisting essentially of a heat treated alloy of chrome, molybdenum and iron; and

f) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move

said armature and change the control state of said valve.

24. A valve according to claim 23, wherein said armature pole portion contacts a surface of said barrier means when said gap is closed to change the control state of said valve and wherein said pole portion is provided with passage means through the body thereof to reduce the time required for said pole portion to separate from said barrier means during movement of said armature and to reduce surface tension effects between said barrier means and said pole portion.

25. A valve according to claim 23, wherein said armature pole portion and said plunger portion are of fixed length and wherein said one port is located in a component of said housing separated from the remainder of said housing by shim means so as to allow adjustment of the distance between said one port and said valve means on said plunger portion.

26. A valve according to claim 23, wherein said valve means comprises a valve seat carried by said plunger and having a surface disposed substantially perpendicular to the direction of travel of said armature and wherein said one port is defined on an inner surface of said housing having a frusto conical formation diverging away from said valve seat surface to facilitate initial fluid flow upon opening of said valve.

27. A valve according to claim 23, wherein said armature plunger portion is provided with guiding means in the form of a flange disposed substantially perpendicular to the direction of armature travel and having a peripheral surface in closely spaced relation to the inner surface of said housing.

28. A valve according to claim 27, further including at least one flow passage means formed in said peripheral surface of said flange.

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29. A valve according to claim 23, wherein said housing is elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and wherein said fluid containing region of said housing and said electromagnet means are in axially spaced relation along said housing longitudinal axis.

30. A valve according to claim 23, wherein said armature pole portion contacts said barrier means when said gap is closed to change the control state of said valve and wherein said barrier means includes a surface portion of conical shape wherein the apex of the cone faces toward said armature pole portion so as to enhance the separation of said pole portion from said barrier means during movement of said armature.

31. A valve according to claim 23, wherein said armature pole portion is formed of an alloy of chrome, molybdenum and iron and then subjected to magnetic annealing for a relatively short time at a temperature above that which can form a harmful second phase in the alloy followed by cooling at a rate rapid enough to avoid second phase formation but not so rapid as to degrade the magnetic properties of the alloy.

1. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

a) a housing including a fluid containing region having first and second chambers and first and second ports in fluid communication with said first and second chambers, respectively;

b) electromagnet means carried by said housing and located externally of said fluid containing region;

c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;

d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;

e) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;

f) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;